IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with <u>underlining</u> and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please CANCEL claims 1, 5, and 9 without prejudice; AMEND claims 2-4 and 13-14 and ADD new claims 15-17 as follows.

1.   (CANCELLED)

2.   (CURRENTLY AMENDED)   A picture recognition apparatus according to claim ~~1~~ <u>4</u>, wherein a Lambertian reflection model is assumed as surface characteristics of the object to be a recognition target.

3.   (CURRENTLY AMENDED)   A picture recognition apparatus according to claim ~~1~~ <u>4</u>, wherein, in the picture information input part, a portion including the object to be a recognition target is cut out from a picture, and the object to be a recognition target is modeled using the cut out portion.

4.   (CURRENTLY AMENDED)   <u>A picture recognition apparatus</u> ~~according to claim 1~~, <u>comprising:</u>
<u>an object modeling execution part for estimating variations in appearance of an object caused by variations in a capturing environment and modeling the object;</u>
<u>an object model registering part for previously registering the object model obtained in the object modeling execution part in a database;</u>
<u>a picture information input part for inputting picture information of an object to be a recognition target;</u>
<u>a similarity determining part for matching the input picture information with the object model previously registered in the object model registering part, and determining a similarity with respect to the registered object model; and</u>
<u>an object recognizing part for outputting a type of the object to be a recognition target determined to be most similar among the registered object model,</u>

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wherein, in the object modeling execution part, information of a plurality of pictures captured by changing a relative position and posture of the object with respect to the fixed picture information input part is input, and variations in appearance of the object caused by possible variations in a capturing environment are estimated to be modeled based on the input information of a plurality of pictures,

wherein, in the picture information input part, a characteristic small region in the object to be a recognition target is selected from a picture, and the object to be a recognition target is modeled based on information included in the selected small region and arrangement information of the small region, and

wherein the modeling in the picture information input part is performed by identifying a partial space in which a vector having a pixel value of the small region as an element is varied.

(CANCELLED)

6.   (ORIGINAL) A picture recognition apparatus according to claim 2, wherein, in the object modeling execution part, variations in appearance caused by variations in a posture of the object and variations in appearance caused by variations in illumination conditions are separately modeled based on the input picture information.

7.   (ORIGINAL)   A picture recognition apparatus according to claim 3, wherein, in the object modeling execution part, variations in appearance caused by variations in a posture of the object and variations in appearance caused by variations in illumination conditions are separately modeled based on the input picture information.

8.   (ORIGINAL)   A picture recognition apparatus according to claim 4, wherein, in the object modeling execution part, variations in appearance caused by variations in a posture of the object and variations in appearance caused by variations in illumination conditions are separately modeled based on the input picture information.

9.   (CANCELLED)

10.   (ORIGINAL)   A picture recognition apparatus according to claim 2, wherein, in the object modeling execution part, variations in appearance caused by variations in a posture of the object and variations in appearance caused by variations in illumination conditions are modeled together based on the input picture information.

11.   (ORIGINAL)   A picture recognition apparatus according to claim 3, wherein, in the object modeling execution part, variations in appearance caused by variations in a posture of the object and variations in appearance caused by variations in illumination conditions are modeled together based on the input picture information.

12.   (ORIGINAL)   A picture recognition apparatus according to claim 4, wherein, in the object modeling execution part, variations in appearance caused by variations in a posture of the object and variations in appearance caused by variations in illumination conditions are modeled together based on the input picture information.

13.   (CURRENTLY AMENDED)   A picture recognition method, comprising:
estimating variations in appearance caused by variations in a capturing environment and modeling the object;
previously registering the obtained object model in a database;
inputting picture information of an object to be a recognition target;
matching the input picture information with the previously registered object model to determine a similarity with respect to the registered object model; and
outputting a type of the object to be a recognition target determined to be most similar among the registered object models,
wherein, in the modeling, information of a plurality of pictures captured by changing a relative position and posture of the object is input, and variations in appearance of the object caused by possible variations in a capturing environment are estimated to be modeled based on the input information of a plurality of pictures,
wherein, in the picture information inputting, a characteristic small region in the object to be a recognition target is selected from a picture, and the object to be a recognition target is modeled based on information included in the selected small region and arrangement information of the small region, and
wherein the modeling in the picture information inputting is performed by identifying a partial space in which a vector having a pixel value of the small region as an element is varied.

14.　(CURRENTLY AMENDED)　A computer-readable recording medium storing a program for allowing a computer to execute the following operations of:to be executed by a computer, the program comprising:

estimating variations in appearance caused by variations in a capturing environment and modeling the object;

previously registering the obtained object model in a database;

inputting picture information of an object to be a recognition target;

matching the input picture information with the previously registered object model to determine a similarity with respect to the registered object model; and

outputting a type of the object to be a recognition target determined to be most similar among the registered object models,

wherein, in the modeling, information of a plurality of pictures captured by changing a relative position and posture of the object is input, and variations in appearance of the object caused by possible variations in a capturing environment are estimated to be modeled based on the input information of a plurality of pictures,

wherein, in the picture information inputting, a characteristic small region in the object to be a recognition target is selected from a picture, and the object to be a recognition target is modeled based on information included in the selected small region and arrangement information of the small region, and

wherein the modeling in the picture information inputting is performed by identifying a partial space in which a vector having a pixel value of the small region as an element is varied.

15.　(NEW) The picture recognition apparatus according to claim 4, wherein the modeling in the picture information input part is performed by separating the partial space in which the vector having a pixel value of the small region as an element into a partial space corresponding to geometric variations and a partial space corresponding to the photometrical variations, and identifying each of the partial spaces successively using sample data.

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16.   (NEW) The picture recognition method according to claim 13, wherein the modeling in the picture information input part is performed by separating the partial space in which the vector having a pixel value of the small region as an element into a partial space corresponding to the photometrical variations, and identifying each of the partial spaces successively using sample data.

17.   (NEW)   The recording medium according to claim 14, wherein the modeling in the picture information input part is performed by separating the partial space in which the vector having a pixel value of the small region as an element into a partial space corresponding to geometric variations and a partial space corresponding to the photometrical variations, and identifying each of the partial spaces successively using sample data.